P-3060

SERIAL NO. 3083

ONKYO® SERVICE MANUAL

DUAL SUPER SERVO
STEREO PREAMPLIFIER
MODEL P-3060

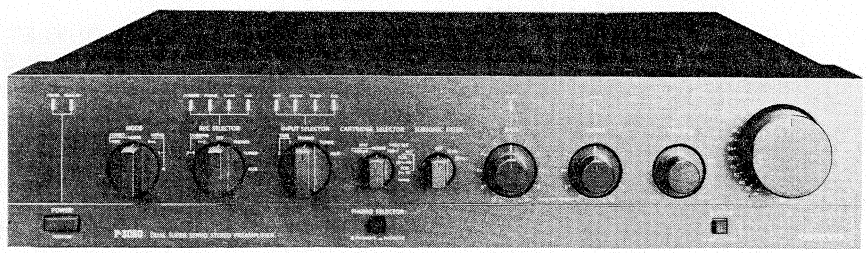


TABLE OF CONTENTS

Item	Page
Specifications	2
Features	2
Block diagram	3
Service procedures	3
Circuit description	4
Component location	6
Exploded view	7
Packing procedures	8
Schematic diagram	9
Printed circuit board view	11
Printed circuit board-parts list	12
Adjustment	15
Connection diagram	16

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

Input Sensitivity and Impedance:	PHONO MC:	HIGH MC 2.5 mV/100 ohms 130 μV/(100/330) ohms
	PHONO MM:	2.5 mV/(NORMAL/400 pF)
	TUNER:	150 mV/47 kΩ
	TAPE PLAY:	150 mV/47 kΩ
	AUX:	150 mV/47 kΩ
Rated Output and Impedance:	TAPE REC:	150 mV/2.2 kΩ (PHONO)
	OUTPUT:	1.5 V/220 Ω Max. 20 V
RIAA Deviation:	±0.2 dB, 20 – 20,000 Hz	
Frequency Response (TUNER):	+0, –3 dB, 0.8 Hz – 170 kHz	
Phono Overload:	PHONO MM:	300 mV RMS at 1 kHz, THD. 0.05% 1400 mV RMS at 10 kHz, THD. 0.05%
	PHONO MC:	17 mV RMS at 1 kHz, THD. 0.05% 82 mV RMS at 10 kHz, THD. 0.05%
Total Harmonic Distortion:	0.004% at PHONO MM, 3 V output 0.018% at PHONO MC, 3 V output 0.003% at TUNER, AUX, TAPE, 3V output	
Intermodulation Distortion:	0.003% (70 Hz: 7 kHz = 4:1)	

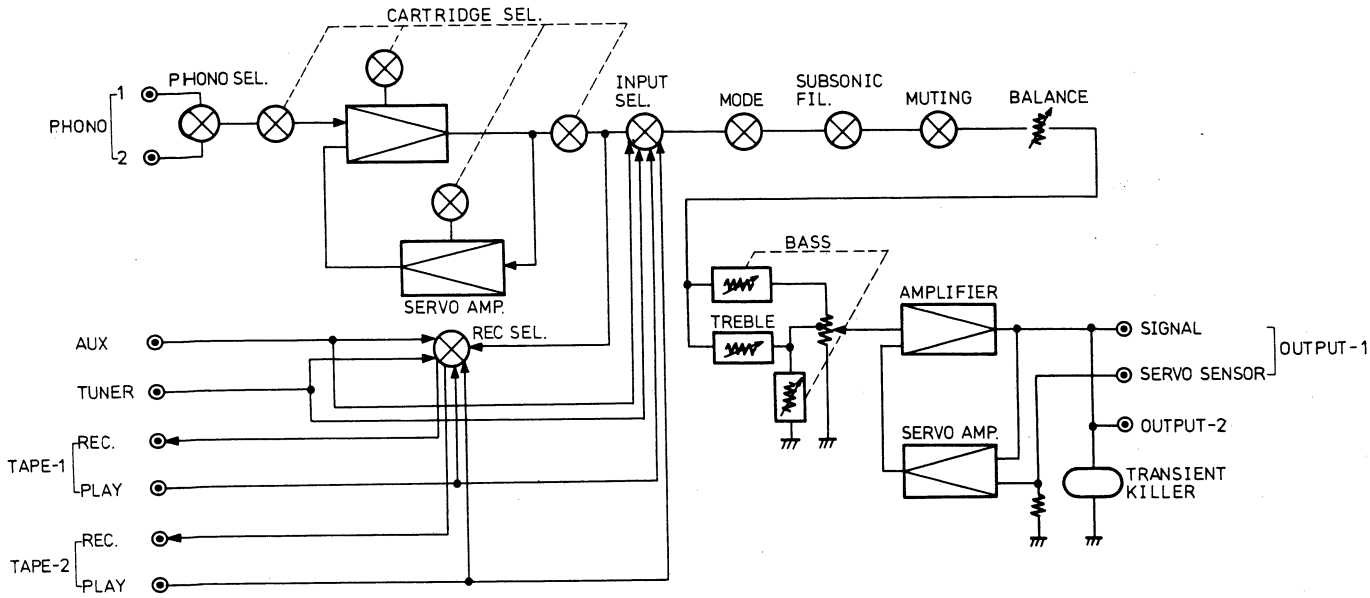
Signal to Noise Ratio:	PHONO MC:	76 dB (IHF A-202)
	PHONO MM:	82 dB (IHF A-202)
	TUNER:	93 dB (IHF A-202)
Tone Control: (Vol. –20 dB)	BASS:	±8 dB at 70 Hz
	TREBLE:	±8 dB at 20 kHz
Filters:	HIGH CUT:	(Vol. min.) 6 dB/oct, 7 kHz
	SUBSONIC:	6 dB/oct 15 Hz/20 Hz
Audio Muting:	–20 dB	
Rated Output Voltage:	1.5 V	
Power Supply Rating:	AC 120 V 60 Hz (D model) AC 220 V 50 Hz (G model)	
Inputs:	PHONO 1 & 2 TUNER TAPE PLAY 1 & 2 AUX	
Outputs:	TAPE REC OUT 1 & 2	
	OUTPUT:	–1 (for servo sensor cable used) –2 (for normal cable)
	AC OUTLET (SWITCHED x 2 UNSWITCHED x 1) (D model)	
Semiconductors:	47 Transistors, 37 Diodes, 6 FETs, 4 ICs	
Dimensions:	450(W) x 99(H) x 407(D) mm (17-3/4" x 3-15/16" x 16")	
Weight:	7.2 kg. (15.8 lbs.)	

Specifications and features are subject to change without notice.

FEATURES

1. **Dual Super-Servo System**
   One of the results of using a super-servo preamp has been that negative feedback and coupling capacitors could be done away with, creating a direct line from the cartridge to the speaker. Now, through the use of a dual super-servo making even closer coupling possible, the deifference in ground potential between the preamp and power amp has been eliminated. Thus, distortion resulting from ground impedance is no longer an element, and musical resolution (harmonic separation) has been improved dramatically.
2. **Dual Direct Amp Configuration**
   The most desirable feature in a preamp tasked to handle minute input signals is a simple signal path with high performance characteristics. As a result of research and development in servo technology, the P–3060 employs an extremely simple dual amp configuration consisting of a single stage type MM/MC cartridge compatible variable gain equalizer, direct tone control, and two high performance output amps; directly coupled without the use of a coupling capacitor.
3. **Direct Tone Control**
   Direct tone control doesn't call for a tone amp or even a buffer amp; it consists only of passive elements, this from the standpoint of tonal quality being most ideal. No coupling capacitors are used; it is most simple and direct.
4. **Combining the Dual Super-Servo System with the M–5060**
   Since the P–3060 is a dual super-servo amp, it can be connected to any power amp and ground potential difference will be absorbed, resulting in perfect matching, however used together with the M–5060 Dual Super-Servo Power Amp, both components superior musical resolution qualities are combined and multiplied, opening up a whole new dimension in sound.
5. **Power Amp Matching**
   The compatibility between preamps and power amps has frequently been criticized, mostly on account of ground potential and impedance matching between the two amps. However, with the dual super-servo amp ground potential differences are no longer a problem and a much closer coupling has been attained.
6. **System Quality**
   From the power supply to the discrete components used in the system, all parts are selected based on their performance in an audio system.

BLOCK DIAGRAM



SERVICE PROCEDURES

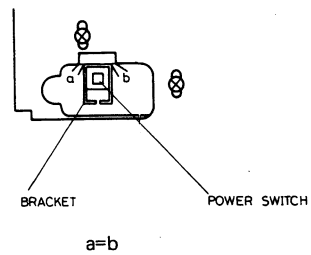
1. Replacing the fuse

For continued protection against fire hazard, replace only with same type and same rating.

	CIRCUIT NO.	PARTS NO.	DESCRIPTION	
AC fuse	F001	252045	1A(ST-6)	120V model
±B fuse	F901, F902	252023	0.5A-T	
AC fuse	F001	252087	0.2A-SE-EAWK	220V model
±B fuse	F901, F902	252023	0.5A-T	

2. Replacing the power switch (Only 120V model)

(1) Remove the top cover and front panel.
(2) Remove the power switch.
(3) Mount the power switch to the position as shown the diagram.
(4) Insert the power switch knob between the power switch and bracket.



CIRCUIT DESCRIPTION

Dual Super-Servo

(1) Theory

Onkyo's super-servo amp using ultralow frequency feedback servo circuits consisting of high-performance operational amplifiers has completely done away with a number of problems that have heretofore plagued amplifiers. These include distortion caused by capacitors used in the signal path, internally generated noise in the ultralow frequency range, and a lack of frequency response in the low ranges caused by record warp and tonearm resonance. Frequency response and tonal quality is as never before. The newly developed dual super-servo system has an additional function over our previous super-servo amp. That additional function may be noted by looking at the accompanying series of illustrations. First note the commonly used unbalanced NF amp depicted in Fig. 1 where the signal is input at point A as referenced to point B, and output at point C as referenced to point B. Common input/output reference in amplifiers is an ideal, but in fact difficult to attain. This is particularly true in power amps with high output current; unless impedances are matched, it is next to impossible. In Fig. 2, very small impedances are present at the same time return current is flowing from other circuits, thus the circuit in Fig. 2 may be considered equivalent to that of Fig. 3. Up to now, in order to lower these unnecessary impedances, large diameter wiring and busbar grounds have been used with some degree of effectiveness, however we have improved upon these methods. Looking at the problem from another angle, the dual super-servo solves the problem without improvisions. As noted in Fig. 4, by applying a super-servo to the positive side, and with a servo return on the negative side, unnecessary signal components are equalized, consequently cancelled. And because the same potential exists, ground potential between input and output is the same. Put another way, in Fig. 5 and 6 the unnecessary components generated between input and output are short-circuited by the servo-circuit. Next, with separate amps, generally the preamp and main amp have been thought of as separate entities. A number of amp combinations have been used, but here again compatibility, or the lack of, may be attributed to ground potential in most cases. Also in the cables connecting 2 amps, there is cord impedance, contact resistence at the pin connector and wiring impedance to contend with, and even though the pin connectors are separated left from right, they became common via the power amp ground. This results in crosstalk between the left and right channel, poor channel separation, duller sound resolution and presence. And any difference in the ground potential between the preamp and power amp is detected and equalized by the servo. This is equal to the grounds of both amps being directly connected. A special super-servo cord with a negative servo sensor is provided to use in connecting the preamp and power amp (P-3060).

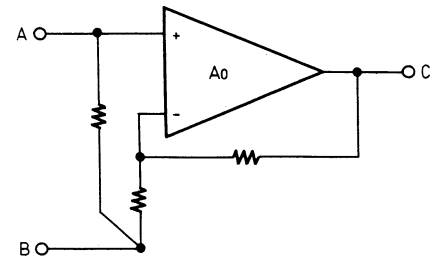


Fig. 1

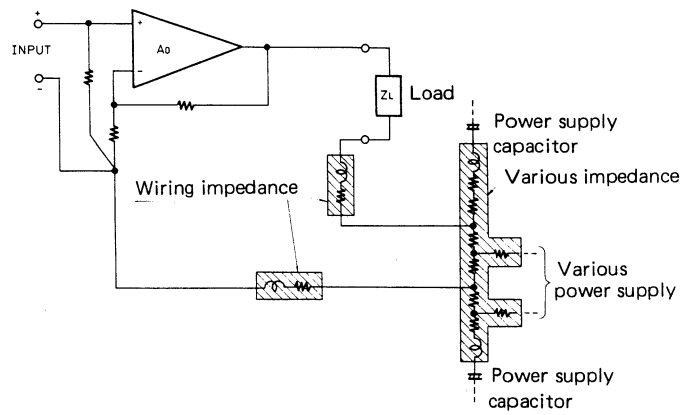


Fig. 2

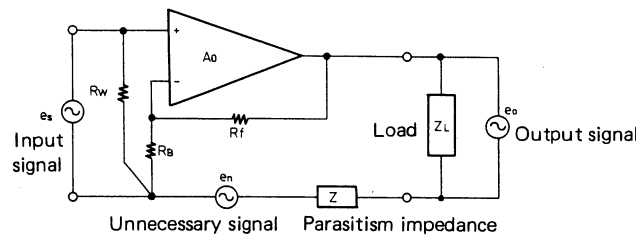


Fig. 3

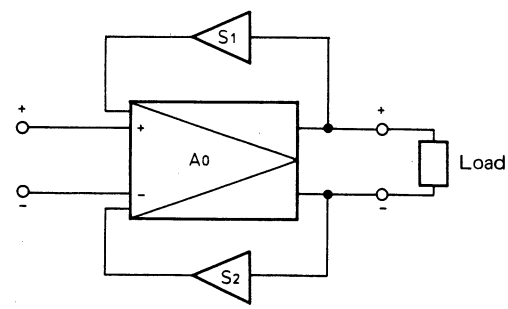


Fig. 4

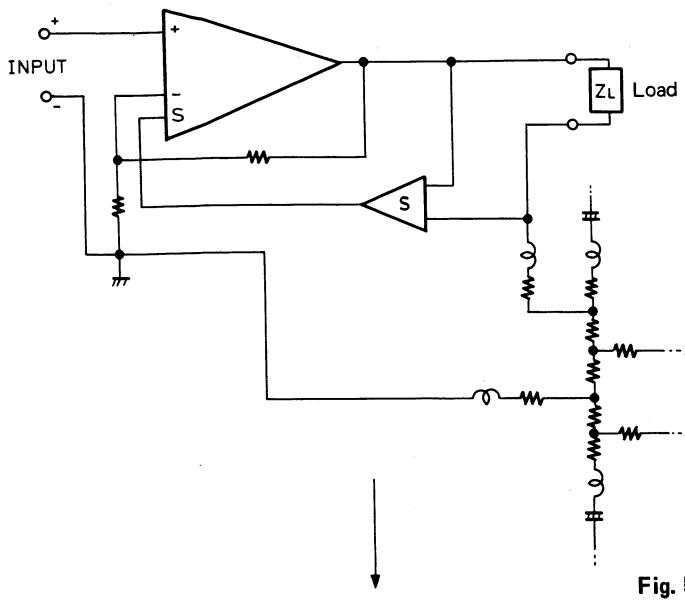


Fig. 5

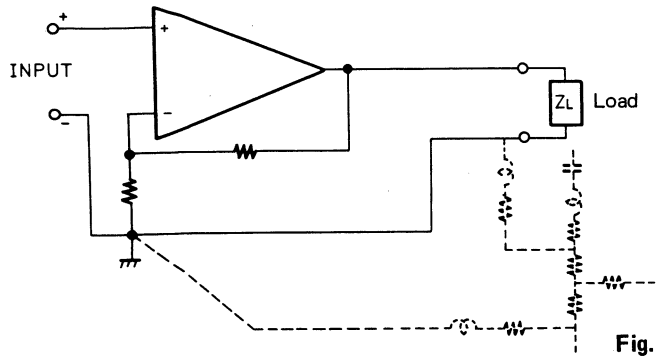


Fig. 6

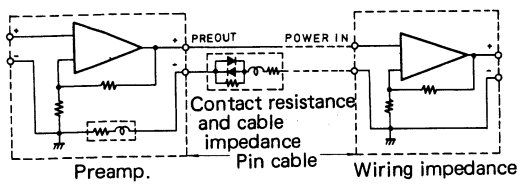


Fig. 7

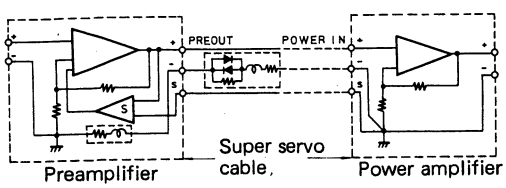


Fig. 8

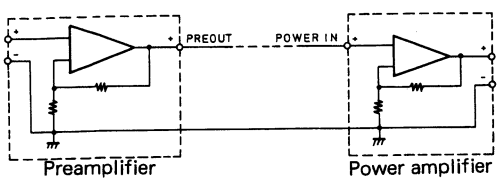
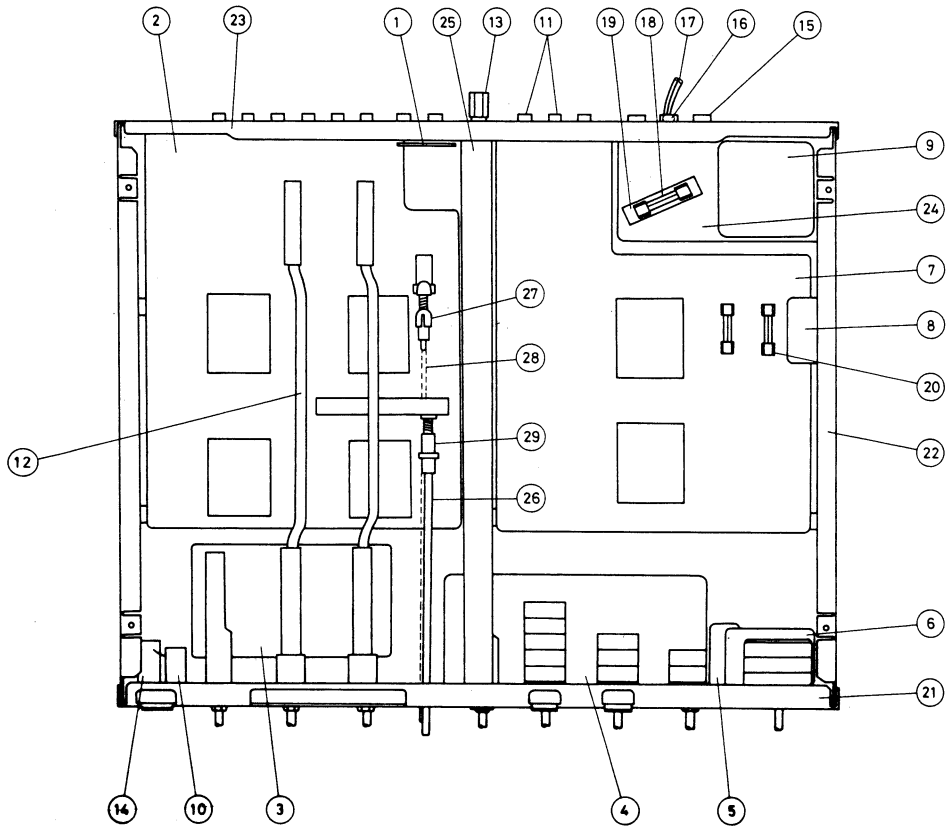


Fig. 9

(2) Preamp to power amp pin cable

Unlike the power amp, the preamp doesn't handle high current, thus it is possible to hold internal impedances resulting in lower tone quality to a low level. However, where separate amps are used the preamp must be connected to the power amp using a pin cable. The cable has impedance, and there is contact resistance at the jack, and wiring impedance. Thus, crosstalk is generated resulting in poor separation, affecting sound resolution and presence merely because of this connector. In the dual super-servo, both positive and negative terminals of the signal path are controlled by servo; even the ground terminal is servo controlled. Thus, any ground potential difference between the preamp and power amp is detected, suppressed and locked in the feedback loop. This is equivalent to both amps being commonly grounded. A special super-servo cord with a negative servo sensor is provided with the P–3060. Connecting the pre and main amp with this cord will result in dual super-servo operation. A regular cable may be used, however the P–3060 will only perform as a super-servo amp in that case.

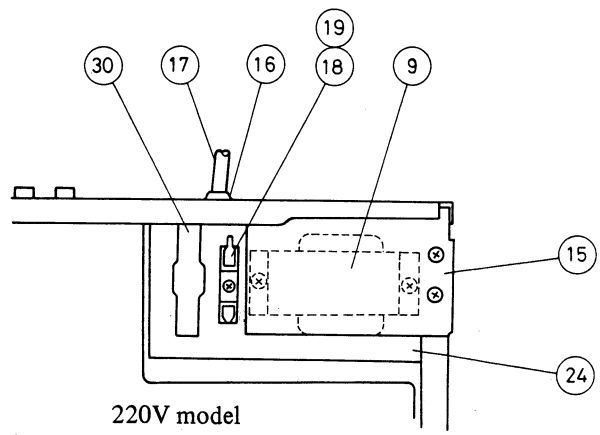
COMPONENT LOCATION



COMPONENT LOCATION–PARTS LIST

120V Model

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1	U01	12629548A	NAPJ-748a, Phono 1/2 input terminal pc board
2	U02	12629521A	NAEQ-721a, Equalizer amplifier pc board
3	U03	12629522A	NASW-722a, Switch circuit pc board
4	U04	12629523A	NATC-723a, Tone control circuit pc board
5	U05	12792524	NAAB-724, Muting circuit pc board
6	U06	12792525	NAVR-725, Volume control pc board
7	U07	12629526A	NAOP-726a, Output amplifier and power supply pc board
8	U08	12792580	NAPC-780, Protector circuit pc board
9	T001	230389	NPT-687D, Power transformer
10	C001	3500057	125V, 103M, CS capacitor
11	P001	25045052	NPJ-4PRBL26, Output terminal
12	S102c, S103c	25065094B	Wire for remote switch
13	P003	TP160B	Ground terminal
14	S001	25035201	NPS-111-L165P, Power switch
15	P003-P005	25050032	S-I6444-01, AC outlet
16	W001a	270280	SR-4K-4, Strainrelier
17	W001	253100	AS-UC-4, Power supply cord
18	F001	252045	1A(ST-6), AC fuse
19	F001a	25050050A	HO438A, Fuseholder
20	F901, F902	252023	0.5A-T, AC fuse
21		27110091A	Front bracket
22		27115050A	Side bracket
23		27120232	Back panel
24		27130163A	Bracket for power transformer
25		27130162A	Bracket
26		27260028A	Shaft
27		28320135	Push knob
28		27260027	Shaft
29		27273008	Joint



220V model

COMPONENT LOCATION – PARTS LIST

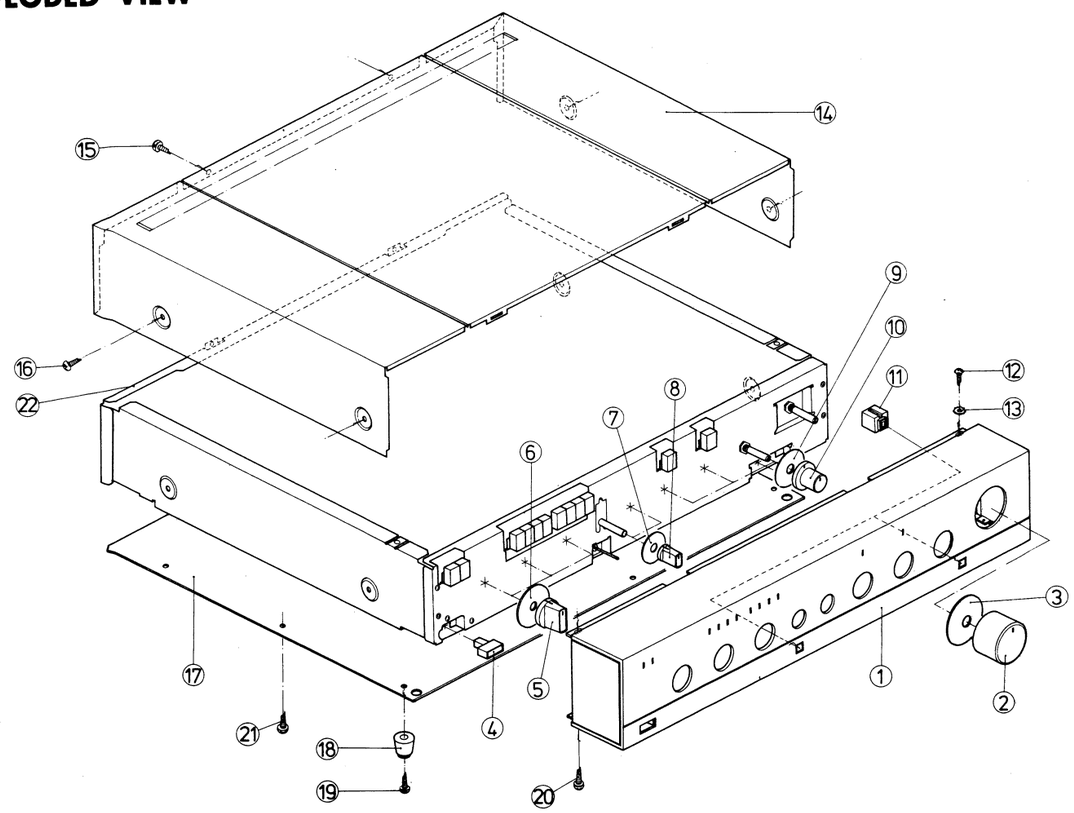
220V Model

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1	U01	12629548A	NAPJ-748a, Phono 1/2 input terminal pc board
2	U02	12629521A	NAEQ-721a, Equalizer amplifier pc board
3	U03	12629522A	NASW-722a, Switch circuit pc board
4	U04	12629523A	NATC-723a, Tone control circuit pc board
5	U05	12792524	NAAB-724, Muting circuit pc board
6	U06	12792525	NAVR-725, Volume control pc board
7	U07	12629526A	NAOP-726a, Output amplifier and power supply pc board
8	U08	12792580	NAPC-780, Protector circuit pc board

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
9	T001	230390A	NPT-687G, Power transformer
10	C001	3500058	PME265M510, IS capacitor
11	P001	25045052	NPJ-4PRBL26, Output terminal
12	S102c, S103c	25065094B	Wire for remote switch
13	P003	TP160B	Ground terminal
14	S001	25035176	NPS-111-L140, Power switch
15		27140417	Bracket, Power transformer
		28140276	Cushion
16	W001a	270280	SR-4K-4, Strainrelief
17	W001	253083	AS-CEE, Power supply cord
18	F001	252087	0.2A-SE-EAWK, AC fuse
	F001b	27300326	FC-20, Fuse cover

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
19	F001a	25065096	NPF-073, Fuseholder
20	F901, F902	252023	0.5A-T, AC fuse
21		27110091A	Front bracket
22		27115050A	Side bracket
23		271200233	Back panel
24		27130163A	Bracket for power transformer
25		27130162A	Bracket
26		27260028A	Shaft
27		28320135	Push knob
28		27260027	Shaft
29		27273008	Joint
30		25108002	MD2R, Terminal

EXPLODED VIEW

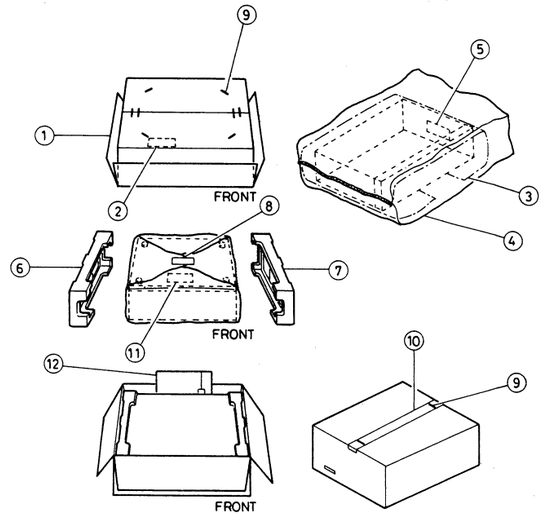


EXPLODED VIEW – PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION
1	12629121	Front panel ass'y
	28125071	End cap (L)
	28125072	End cap (R)
	28198523A	Facet
	27267056	Guide for power switch knob
2	28320273B	Knob (VOL)
3	28140126	53mm, Cushion
4	28320279	Knob (POW)
5	28320275B	Knob (SEL)
6	28140185	40mm, Cushion
7	28140127	32mm, Cushion
8	28320276B	Knob (LEV)
9	28140185	40mm, Cushion
10	28320274B	Knob (TONE)
11	12792125	Push switch knob ass'y
	28320366	Knob

REF. NO.	PARTS NO.	DESCRIPTION
	27267054A	Guide
	27180037A	Spring
12	831430082	3STW+8BQ(BC), Tapping screw
13	87313006	M3B, Toothed washer
14	28184065	Cover
	28140020	Cushion
15	834430062	3STS+6BQ(BC), Tapping screw
16	838440089	4TTB+8(C)(BC), Tap screw
17	27170065	Bottom board
18	27175009	T-C, Leg
19	834130122	3STS+12BQ, Tapping screw
20	834430062	3STS+6BQ(BC), Tapping screw
21	831430082	3STW+8BQ(BC), Tapping screw
22	27120232	Back panel (120V model)
	27120233	Back panel (220V model)

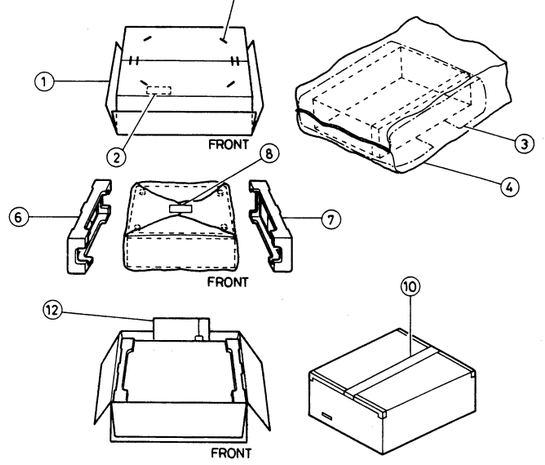
PACKING PROCEDURES



PACKING PROCEDURES – PARTS LIST

120V Model

REF. NO.	PARTS NO.	DESCRIPTION
1	29050374A	Master carton box
2	29090544	Pad
3	29095012-1	500x800mm, Protection sheet
4	29100034	650x850mm, Poly bag
5	29355059	Label
6	29090453	Pad (R)
7	29090452	Pad (L)
8	261504	W=30, Tape
9	282301	Sealing hook
10	260012	W=50mm, Tape
11	29360363	Caution label
12		Accessary bag complete
	29340430	Instruction manual
	29365006	Warranty card
	29358002	Service station list
	29100006	250x350mm, Poly bag
	2010068	Connection cord
	250153	PO107, Shorted pin (Phono 2)

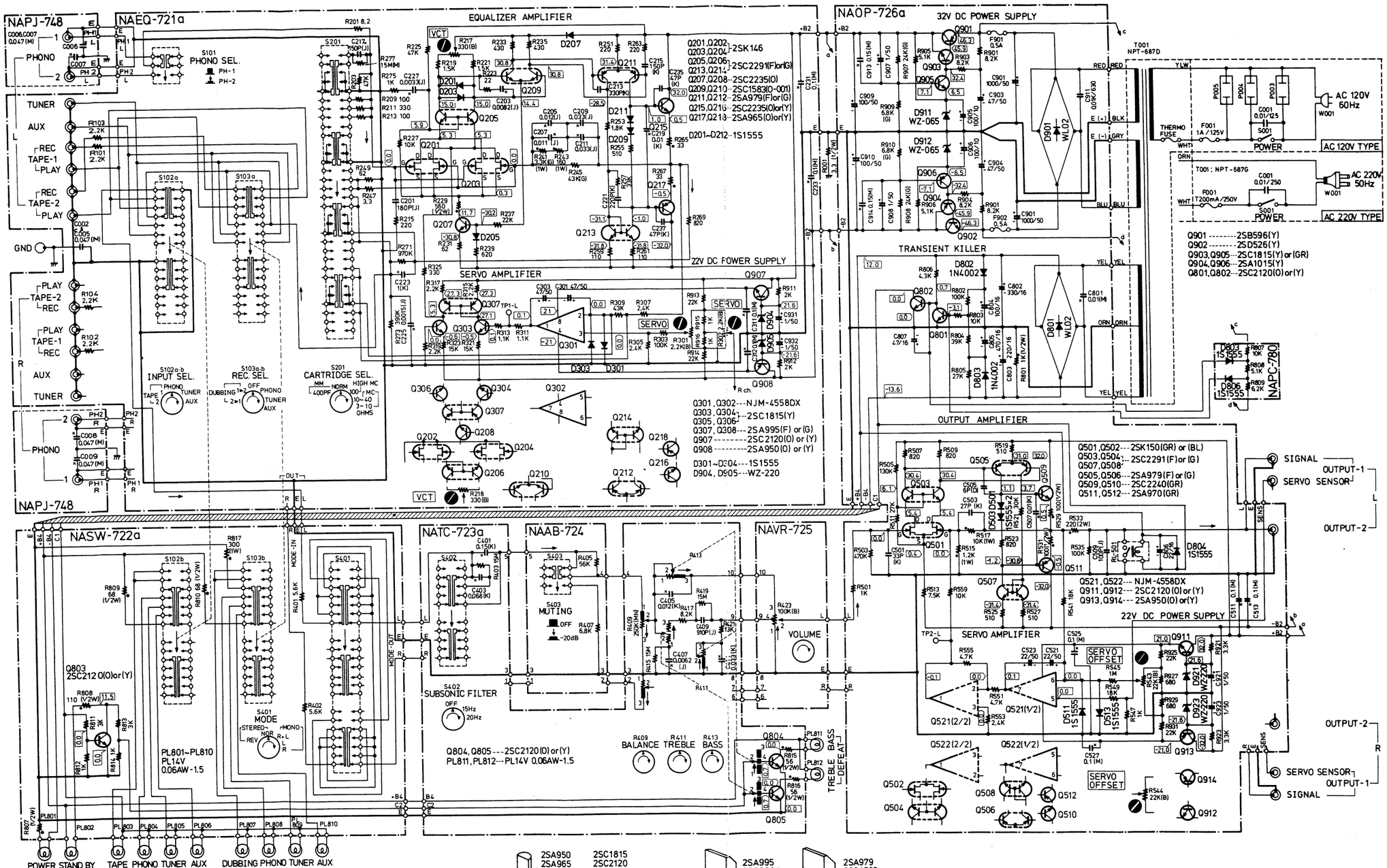


PACKING PROCEDURES – PARTS LIST

220V Model

REF. NO.	PARTS NO.	DESCRIPTION
1	29050374A	Master carton box
2	29090544	Pad
3	29095012-1	500x800mm, Protection sheet
4	29100034	650x850mm, Poly bag
6	29090453	Pad (R)
7	29090452	Pad (L)
8	261504	W=30, Tape
9	282301	Sealing hook
10	260012	W=50mm, Tape
12		Accessary bag complete
	29340433	Instruction manual
	29365005-2	Warranty card (Only Germany model)
	29100006	250x350mm, Poly bag
	2010068	Connection cord
	250153	PO107, Shorted pin (Phono 2)

SCHEMATIC DIAGRAM



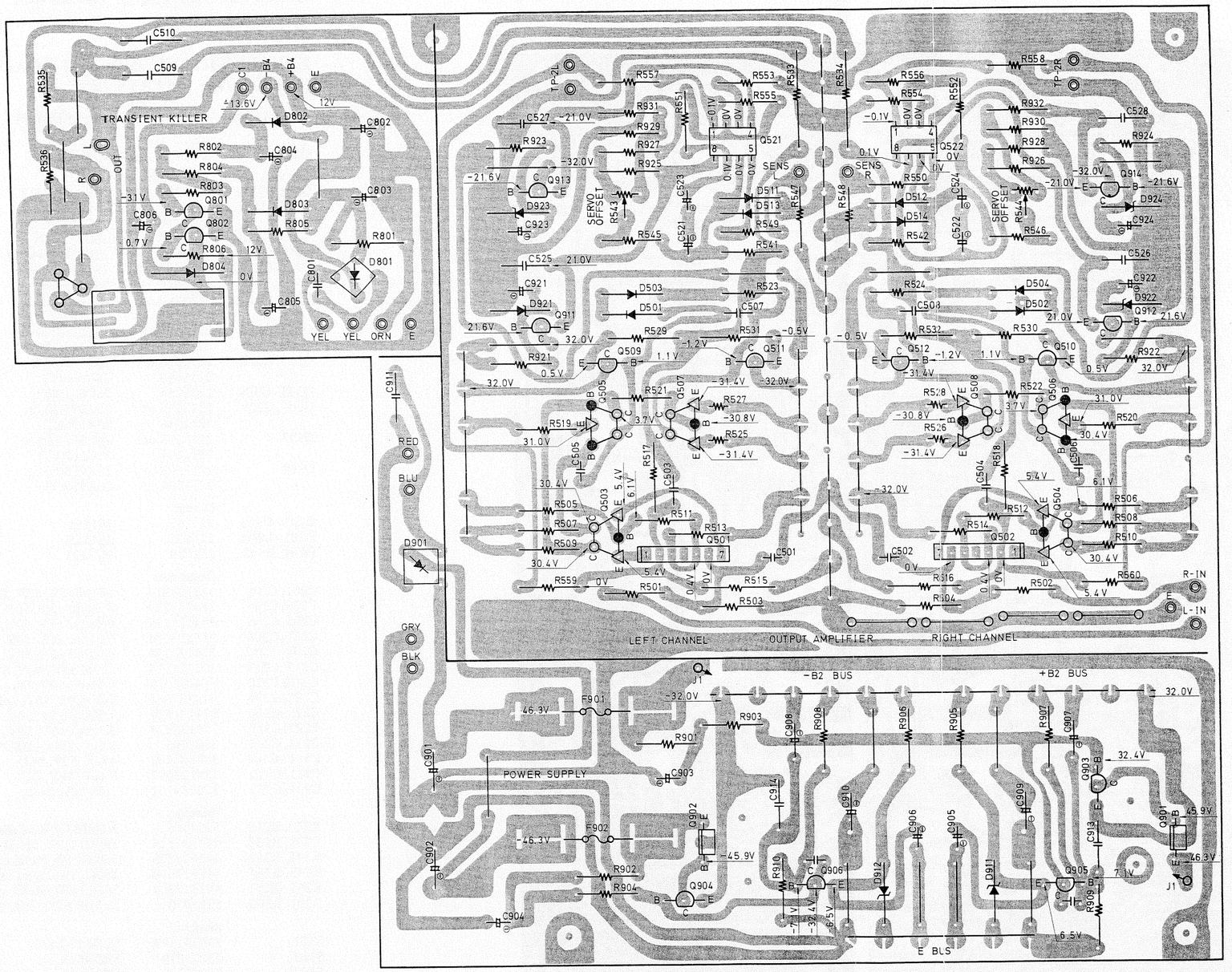
NOTE: 1. DC VOLTAGES (▭) ARE MEASURED WITH V.T.V.M. TO CHASSIS AT NO SIGNAL APPLIED.
2. UNLESS OTHERWISE SPECIFIED.
RESISTORS ARE IN OHMS, ±5%, ¼W.
CAPACITORS ARE IN μF/50V
ELECTROLYTIC CAPACITORS (-|(+)|-) ARE IN μF WV.
3. TOLERANCE

SYM.	G	J	K	M	Z	D
TOL.	±2%	±5%	±10%	±20%	+80% -20%	±0.5PF

4. SYMBOL
× NON-INDUCTIVE POLYESTER FILM CAPACITOR.
● NON-INFLAMMABLE RESISTOR.

ONKYO CORPORATION

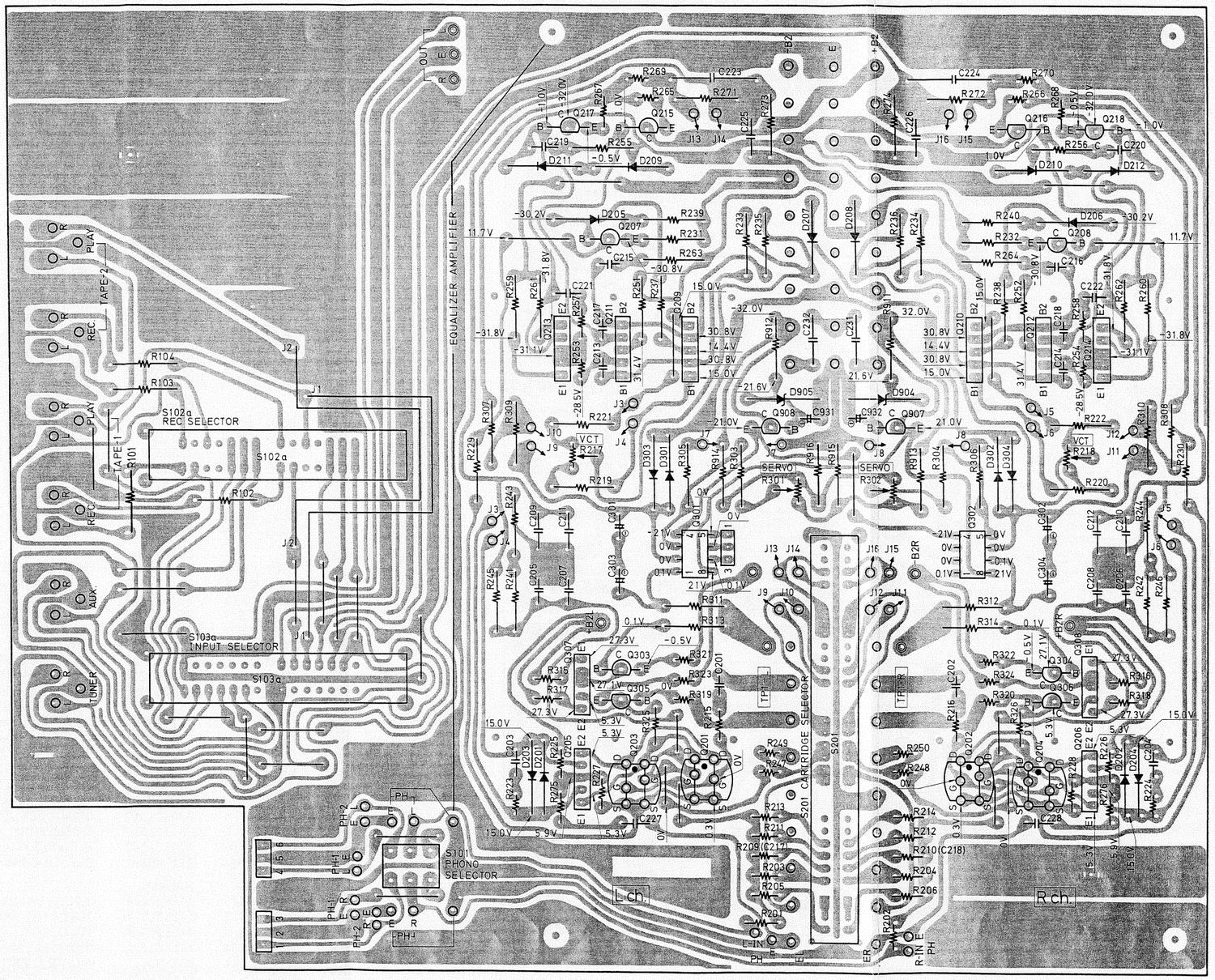
OUTPUT AMPLIFIER PC BOARD VIEW FROM BOTTOM SIDE



OUTPUT AMPLIFIER PC BOARD (NAOP-726a) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q521, Q522	222502	NJM-4558DX
	Transistors	
Q501, Q502	2211475 or 2211476	2SK150(GR) or 2SK150(BL)
Q503, Q504	2211445 or 2211446	2SC2291(F) or 2SC2291(G)
Q505, Q506	2211585 or 2211586	2SA979(F) or 2SA979(G)
Q507, Q508	2211445 or 2211446	2SC2291(F) or 2SC2291(G)
Q509, Q510	2211405	2SC2240(GR)
Q511, Q512	2211395	2SA970(GR)
Q801, Q802	2211163 or 2211164	2SC2120(O) or 2SC2120(Y)
Q901	2200413	2SB596(Y)
Q902	2200744	2SD526(Y)
Q903	2211254 or 2211255	2SC1815(Y) or 2SC1815(GR)
Q904	2211454	2SA1015(Y)
Q905	2211254 or 2211255	2SC1815(Y) or 2SC1815(GR)
Q906	2211454	2SA1015(Y)
Q911, Q912	2211163 or 2211164	2SC2120(O) or 2SC2120(Y)
Q913, Q914	2211503 or 2211504	2SA950(O) or 2SA950(Y)
	Diodes	
D501–D504	223105	1S1555
D511–D514	223105	1S1555
D801	223867	WL02
D802, D803	223839	1N4002
D804	223105	1S1555
D901	223867	WL02
D911, D912	224090	WZ-065
D921–D924	224079	WZ-220
	Capacitors	
C501, C502	372233305	33pF±10%, 50V, ST
C507, C508	374121035	0.01μF, 50V, DE
C509, C510	372321014	100pF±5%, 50V, ST
C521–C524	390882207	22μF, 50V, SLD
C525–C528	374121047	0.1μF, 50V, DE
C801	374121037	0.01μF±20%, 50V, DE
C802	352743311	330μF, 16V, Elect.
C803	352742211	220μF, 16V, Elect.
C804	352741011	100μF, 16V, Elect.
C805	352744711	470μF, 16V, Elect.
C806	352742201	22μF, 16V, Elect.
C807	352744701	47μF, 16V, Elect.
C901, C902	352781021	1,00μF, 50V, Elect.
C903, C904	352781011	100μF, 50V, Elect.
C905, C906	352731011	100μF, 10V, Elect.
C907, C908	352780101	1μF, 50V, Elect.
C909, C910	390881017	100μF, 50V, SLD
C911	384171035	0.01μF±10%, 630V, DT
C913, C914	374121547	0.15μF, 50V, DE
C921–C924	352780101	1μF, 50V, Elect.
	Resistors	
R515, R516	441621224	1.2kΩ, 1W, Metal oxide film
R517, R518	441621034	10kΩ, 1W, Metal oxide film
R529–R532	441521014	100Ω, 1/2W, Metal oxide film
R533, R534	441722214	220Ω, 2W, Metal oxide film
R543, R544	5225076	N10HR22KBDM, Semi-fixed
R801	441521024	1kΩ, 1/2W, Metal oxide film
	Relay	
RL501	25065061	FRL-644D12-2B
	Terminal	
	25045042	NPJ-2PDBL19
	Fuse holder	
	250113	SN-5051

EQUALIZER AMPLIFIER AND PC BOARD VIEW FROM BOTTOM SIDE



PHONO INPUT TERMINAL PC BOARD (NAPJ-748a) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	25045066	NPJ-4PDBL33, Terminal

EQUALIZER AMPLIFIER PC BOARD (NAEQ-721a) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	ICs	
Q301, Q302	222502	NJM-4558DX
	Transistors	
Q201–Q204	2211530	2SK146, F.E.T.
Q205, Q206	2211445 or	2SC2291(F) or
	2211446	2SC2291(G)
Q207, Q208	2211653	2SC2235(O)
Q209, Q210	2210700	2SC1583(O-001)
Q211, Q212	2211585 or	2SA979(F) or
	2211586	2SA979(G)
Q213, Q214	2211445 or	2SC2291(F) or
	2211446	2SC2291(G)
Q215, Q216	2211653 or	2SC2235(O) or
	2211654	2SC2235(Y)
Q217, Q218	2211643 or	2SA965(O) or
	2211644	2SA965(Y)
Q303–Q306	2211254	2SC1815(Y)
Q307, Q308	2211515 or	2SA995(F) or
	2211516	2SA995(G)
Q907	2211163 or	2SC2120(O) or
	2211164	2SC2120(Y)
Q908	2211503 or	2SA950(O) or
	2211504	2SA950(Y)
	Diodes	
D201–D212	223105	1S1555
D301–D304	223105	1S1555
D904, D905	224079	WZ-220
	Capacitors	
C201, C202	372321814	180pF±5%, 50V, ST
C203, C204	374128224	8,200pF±5%, 50V, DE
C205, C206	374121234	0.012μF±5%, 50V, DE
C207, C208	374121134	0.011μF±5%, 50V, DE
C209–C212	374123334	0.033μF±5%, 50V, DE
C217, C218	372321514	150pF±5%, 50V, ST
C219, C220	374121035	0.01μF, 50V, DE
C223, C224	374121055	1μF±10%, 50V, DE
C225, C226	374121524	1,500pF±5%, 50V, DE
C227, C228	374123324	3,300pF±5%, 50V, DE
C231, C233	3800003	0.1μF, 100V, DTG
C301–C304	390884707	47μF, 50V, SLD
C311, C312	374121047	0.1μF, 50V, DE
C931, C932	352780101	1μF, 50V, Elect.
	Resistors	
R217, R218	5225066	N10HR330BDM, Semi-fixed
R229, R230	441525614	560Ω, 1/2W, Metal oxide film
R241, R242	441623323	3.3kΩ, 1W, Metal oxide film
R243, R244	441621614	160Ω, 1W, Metal oxide film
R265–R268	441523304	33Ω, 1/2W, Metal oxide film
R301, R302	5225070	N10HR2.2KBDM, Semi-fixed
	Switches	
S101	25035159A	NPS-122-L123
S102a	25065079	NSS-4643
S103a	25065079	NSS-4643
S201	25030138	NRS-185-20ZR
	Terminal	
	25045043	NPJ-4PDBL20
	Case	
	27300152	

PROTECTOR CIRCUIT PC BOARD (NAPC-780) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
D805, D806	223105	1S1555, Silicon diode

ADJUSTMENTS

(1) Preparations

Place the device on a level surface, and making certain ventilation is not blocked, warm it up for 5 minutes without an input signal and make the following adjustments.

(2) Equalizer amp – Center voltage adjustment

a. Connect a highly sensitive electronic DC voltmeter to the TAPE-REC terminal. (Position the REC-SELECTOR to PHONO)

b. Ground TP1-L (TP1-R) on board NAEQ-721, and adjust the VR R217 (R218) to the point the reading is 0 ± 50 mV.

c. Remove the ground from TP1-L (TP1-R) and after 30 seconds, adjust VR R301 (R302) to the point the reading is 0 ± 150 μV.

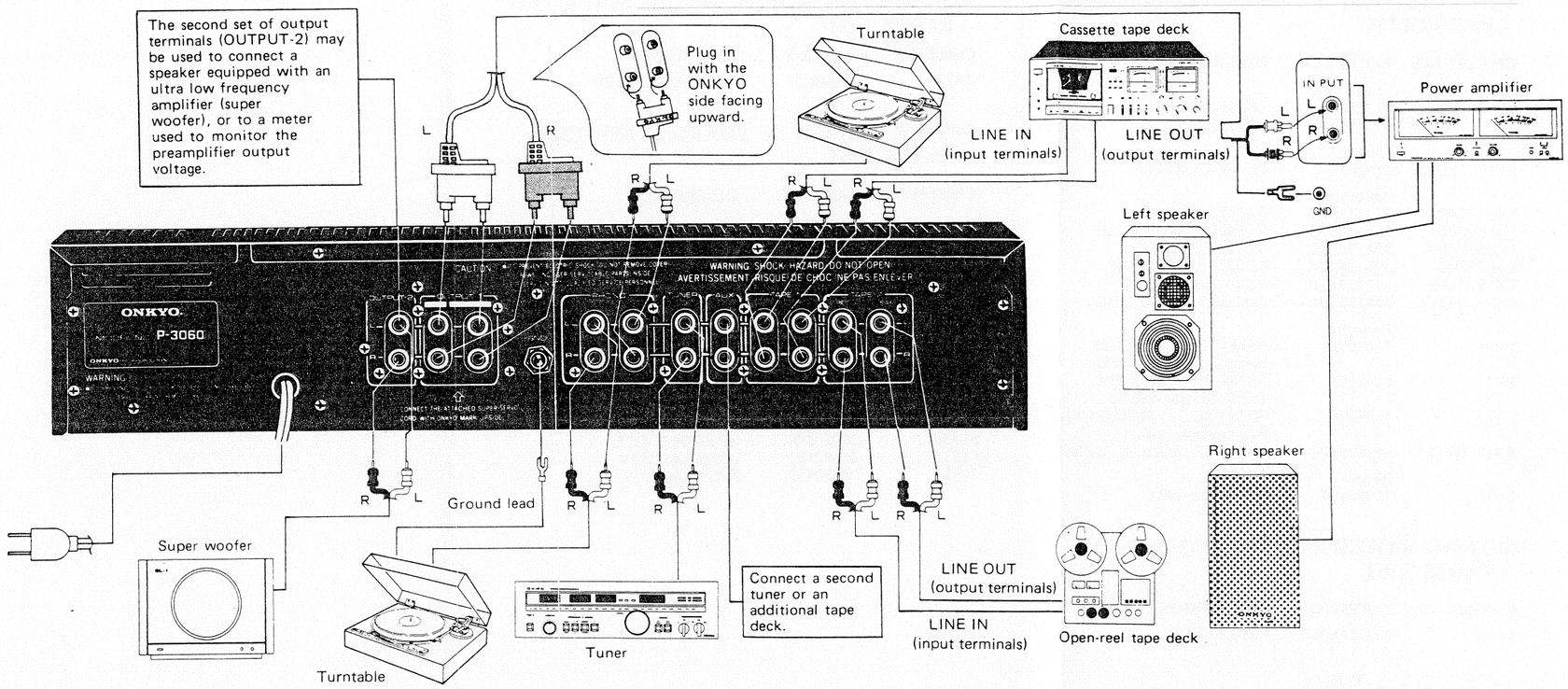
(3) Flat Amp – Center Voltage Adjustment

a. Connect a highly sensitive electronic DC voltmeter to OUTPUT terminal 1 or 2. Turn the VOLUME control all the way to the left.

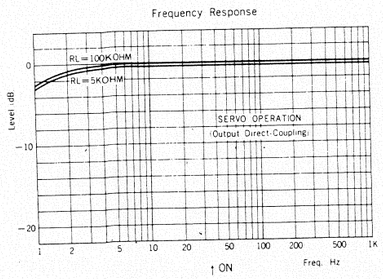
b. Make certain the reading is within ± 400 mV of 0 when TP2-L (TP2-R) on board NAOP–726 is grounded.

c. Remove the ground from TP2-L (TP2-R) and after 30 seconds, adjust VR R543 (R544) to the point the reading is 0 ± 50 μV.

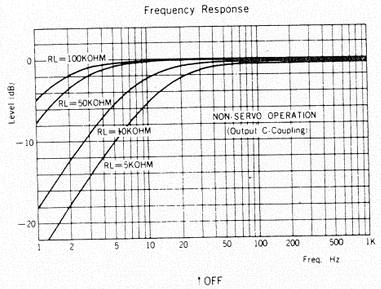
CONNECTION DIAGRAM


The second set of output terminals (OUTPUT-2) may be used to connect a speaker equipped with an ultra low frequency amplifier (super woofer), or to a meter used to monitor the preamplifier output voltage.
Plug in with the ONKYO side facing upward.
Turntable
Cassette tape deck
LINE IN (input terminals)
LINE OUT (output terminals)
IN PUT
Power amplifier
GND
Left speaker
Right speaker
ONKYO
P-3060
WARNING SHOCK HAZARD DO NOT OPEN
AVERTISSEMENT RISQUE DE CHOC NE PAS ENLEVER
Ground lead
Super woofer
Turntable
Tuner
Connect a second tuner or an additional tape deck.
LINE OUT (output terminals)
LINE IN (input terminals)
Open-reel tape deck

FREQUENCY RESPONSE



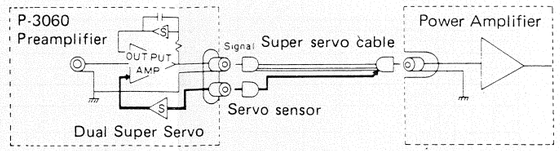
SERVO OPERATION SWITCH



SERVO OPERATION SWITCH

- Do not plug in the power cord until all connections have been completed and thoroughly checked.
- Make sure that the L and R pin-type cables are properly connected to the left and right terminals. Otherwise, the left and right sound will be reversed.
- Also make sure that all pin-plugs are firmly secured. If a plug becomes loose and proper grounding is lost, an unpleasant booming noise is generated. Furthermore, always handle cables with adequate care, holding the plug at its base – not the cable itself – when connecting and disconnecting.
- Although the turntable ground lead is usually connected to the amplifier GND terminal, there are turntables which do not require a ground connection.
- Keep the pin-type cables as far away as possible from the power cord and power transformer area. Otherwise, hum and other unwanted noise may be generated.

Although the P–3060 may be connected to the power amplifier component with normal pin-type cables for normal audio amplifier performance, it will not be possible to take advantage of the Dual Super Servo circuit. If the use of ordinary cables is unavoidable, connect to the power amplifier input terminals via the OUTPUT-1 SIGNAL terminals or the OUTPUT-2 terminals. Connect the ground lead where necessary.



Dual Super Servo Amplifier Connection Super Servo Cable

TONE CONTROL PC BOARD (NATC-723a) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Transistors	
Q804, Q805	2211163 or 2211164	2SC2120(O) or 2SC2120(Y)
	Lamps	
PL811, PL812	210084	PL14V0.06AW-1.5
	Capacitors	
C401, C402	374121545	0.15μF, 50V, DE
C403, C404	374126835	0.068μF±10%, 50V, DE
C405, C406	374121235	0.012μF, 50V, DE
C407, C408	374126224	6,200pF±5%, 50V, DE
C409, C410	372329114	910pF±5%, 50V, ST
C411, C412	374123335	0.033μF±10%, 50V, DE
	Resistors	
R409	5104092	N27RGYC250KMN25M, Balance control variable
R411	5104094	N27RFYS11, 219K25M, Treble control variable
R413	5104093	N27RFYS11, 110K180K25M, Bass control variable
R815, R816	441525604	56Ω, 1/2W, Metal oxide film
	Switch	
S402	25030137	NRSM-143-25ZV

MUTING SWITCH PC BOARD (NAAB-724) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S403	25035160A	NPS-122-L124

VOLUME CONTROL PC BOARD (NAVR-725) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
R423	5104077	N40DGL100KT30M

SWITCH CIRCUIT PC BOARD (NASW-722a) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	Transistor	
Q803	2211163 or 2211164	2SC2120(O) or 2SC2120(Y)
	Lamps	
PL801–PL810	210084	PL14V0.06AW-1.5
	Resistors	
R807	441529104	91Ω, 1/2W, Metal oxide film
R808	441521114	110Ω, 1/2W, Metal oxide film
R809, R810	441526804	68Ω, 1/2W, Metal oxide film
R817	441623014	300Ω, 1W, Metal oxide film
	Switches	
S102b	25030140	NRSM-145-25ZV
S103b	25030141	NRSM-146-25ZV
S401	25030139	NRSM-146-25ZK

OUTPUT V.S T.H.D